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TRAIL & LANDSCAPE

A Publication Concerned With Natural History and Conservation

The Ottawa Field-Naturalists' Club

TRAIL & LANDSCAPE

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Henry Steger
Chair, Membership Committee
September 2014

Winter mortality of Snapping Turtles at Mud Lake

David Seburn and Ian Whyte

Basking Snapping Turtle. Photo credit: David Seburn

Death is a natural part of life, but sometimes there are more deaths at a given time than are expected. In this article we report on an apparently unusual number of dead Snapping Turtles at Mud Lake (Britannia Conservation Area) and speculate on the cause of the mortality. In previous years we have found the odd dead turtle at Mud Lake, but never more than one or two in the spring.

In early May of this year, a few dead Snapping Turtles at Mud Lake were reported on the OFNC facebook page. On 6 May, the two of us set out to Mud Lake to search for dead Snapping Turtles and learn what we could about the event. We focused our efforts only along the south shore of the lake. In total we found six dead turtles, all

adults. The turtles were found from the SW eorner of the lake to the SE eorner, near the boardwalk. Thcre were four males and two females (Table 1). The six turtles averaged 31 cm in carapaee (top shell) length and the average size of the males (32.5 em) was greater than thc females (28.75 cm). Male Snapping Turtles can grow larger than females (Ernst and Lovich 2009) so this size differenee is not surprising. Overall, the dead turtles appeared to be in good condition, with only one of them (#1) displaying any injuries. It appeared that a predator had ehewed on the head and front shoulder of this individual. This turtle was found on shore, while the others were found in the lake but elose to shore. It seems likely that a scavenger preyed on the turtle after it washed up on shore.

Dead Snapping Turtle. Photo credit: Ian Whyte

Given the lack of wounds on most of the turtles it seems unlikely that the turtles were predated while hibernating at thc bottom of Mud Lake. The most likely possibility is that the turtles died over the eourse of the winter. The winter of 2013-14 seemed long and cold to the humans of Ottawa, but was the winter more extreme than usual?

Table 1. Dead adult Snapping Turtles found at Mud Lake on 6 May 2014

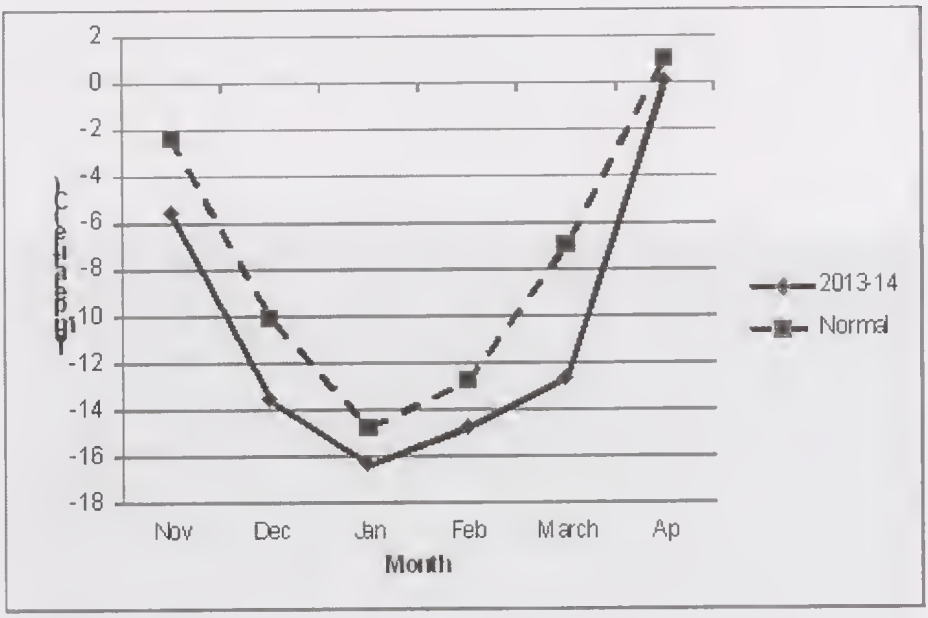
Turtle	Sex	Carapace length (cm)	Notes
1	M	36	Head area and left front shoulder had been chewed on
2	M	31	Good condition
3	M	30.5	Good condition
4	M	30.5	Good condition
5	F	30.5	Good condition
6	F	27	Good condition

We obtained the daily Ottawa weather observations from Environment Canada. Using the daily minimum temperatures we calculated the average monthly minimum temperatures and compared this to the monthly minimum temperatures of the 30 year climate normal. Each month from November to April was colder than the climate normal (Figure 1). A colder than average winter likely would result in thicker ice. It seems possible that some shallow portions of the lake froze right to the bottom. Any turtles that chose such shallow areas to hibernate could have been killed.

Did this event kill all the Snapping Turtles at Mud Lake? Definitely not. On 15 May of this year, one of us (DS) saw four adult Snapping Turtles basking at Mud Lake, equaling his previous daily record (Seburn 2014). Snapping Turtles don't bask as much as Painted Turtles do so it is unclear how many Snapping Turtles live at Mud Lake.

It seems odd that we found only dead Snapping Turtles. There are hundreds of Painted Turtles and at least a few Blanding's Turtles at Mud Lake (Seburn 2014) so why were none of them killed? It is possible that the larger size of Snapping Turtles makes it harder for them to avoid freezing conditions. It is also possible that other species died but we just didn't find their bodies as we did not survey the shore of the entire lake. In any case, the death of six adult Snapping Turtles, even if through natural causes, is likely a significant loss to the population.

Figure 1. Monthly minimum temperatures during the winter of 2013-14 and the 30-year climate normal.



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You have probably seen me hundreds of times

Paul Hamilton

What

This is the most common large alga in the Rideau River (Fig. 1). It is in the green algae group, which means that its evolution is more closely related to the land plants than the other algae (e.g. red algae, brown algae, golden-brown algae, blue-green algae). *Oedogonium* (sound-out, Ou-do-gonium) is a simple filament of cells (not branched) that feels to the touch like a thread (not slippery). There are presently 496 accepted species worldwide with well over 150 species in North America. Filaments are attached to other plants and hard substrates in rivers, lakes, ponds and even ditches. As the population grows, filaments become detached and form large masses which get tangled. By early June the tangled mats can float to the surface of the Rideau River.

Oedogonium is identified by the distinct green chloroplast which is a series of interconnected ribbon-like chloroplast threads (Fig. 2a arrow). Another distinct feature is the collection of caps (isolated severed caps) at one end of a cell (Fig. 3c arrow). The caps are formed by the cell as it pinches off the end and these pinched caps collect at the end of the cell. I know of no other family in the microscopic world where this happens. In identification, either chloroplast shape or the presence of caps can easily identify this genus. The species are identified by the type and form of sexual reproduction.

Where

Oedogonium is very common throughout North America in ion rich waters. Typically found in slow flowing to stagnant waters in lakes stream and ponds. Light and elevated nutrient levels are required to get the formation of thick mats as observed in the Rideau River. In the Rideau this alga is most common from Burritts Rapids to downtown Ottawa. It is also common in wetlands adjacent the Rideau from Burritts Rapids to Smiths Falls and in the downstream wetland of Lower Rideau Lake. The mats of algae are primarily *Oedogonium*, but many other species can be captured in the mat, including *Cladophora* and *Hydrodictyon* (Fig. 2b,c). Notice the difference in branching. For the early part of the growing season, growth is below the water surface, but as the mats develop they float to the surface.

Figure 1. The Rideau River facing north at St. Patrick Street Bridge, Ottawa. A large algae mat floating on the water surface (lower panel).

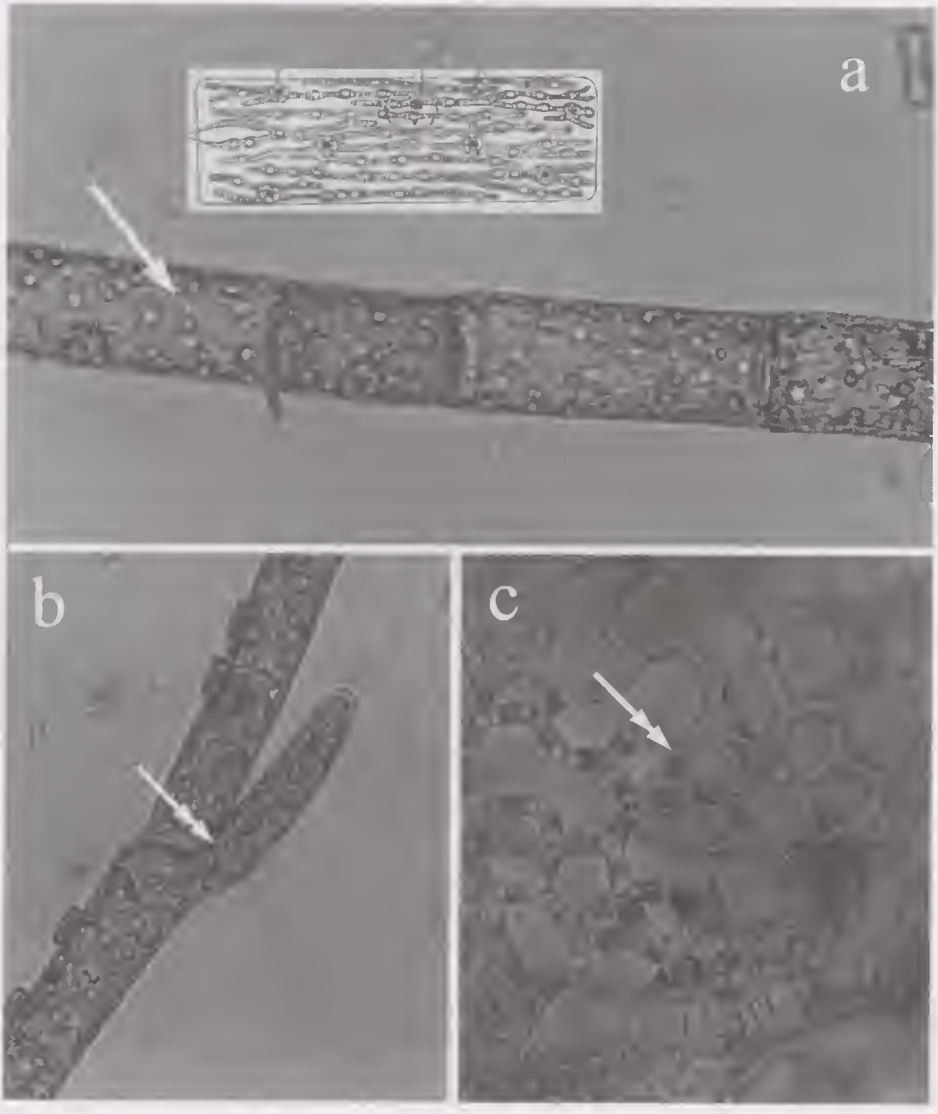

Figure 2. The common large algae of the Rideau River. a) Oedogonium filament representing five cells (no branching). Inset line drawing of a single cell (from F.E. Fritsch). Arrow showing the fine chloroplast strands which is characteristic for this genus. b) The genus Cladophora. This picture illustrates the dense chloroplast and small diatom cells attached on the left side. Double arrow shows branching. c) The genus Hydrodictyon showing the net-like branching pattern. Double arrow showing the junction of two cells.

How

Oedogonium species have a varied and very complex life cycle. Germination happens in the spring with good light, fertilizer and ions (salts). Through cell division the species develop long filaments which form interconnected mats in the water. At the end of the growing season, they can produce simple spores [no sex] from swimming cells (zoospores) which later form into resting spores and subsequently new plants (algae filaments). If sex is the mode of reproduction, selected cells produce swimming androspores which later form male spermatozoids. The filaments also produce female eggs (oogonia). The oogonia are fertilized by spermatozoids forming a fertilized egg (zygote) which later germinates into a new plant-filament. Sexual reproduction is enhanced by good ion levels and low nitrogen relative to phosphorus levels. In some cases even parthenogenesis (some plants and insects develop from a female cell without males) can occur. If you've been keeping track, *Oedogonium* can produce three different types of swimming cells (one for non-sexual reproduction, one for the formation of male plant filaments and one for spermatozoids). Indeed for a simple thread forming species these algae have reproductive life cycles as complex as higher plants and animals.

Figure 2a shows the normal cell growth into filaments. There are 5 individual cells in this filament. When conditions are right androspores (small cells with flagella) emerge from smaller "squashed" cells (Fig. 3b, arrow) and the androspores swim away and attach close to an oogonium (female egg cells, Fig. 3a, arrow). Once attached the androspores develop into small 1-5 cell filaments and the tip cells then form spermatozoids (Fig. 3a double arrow). The sperm cells then swim to the oogonium and enter a pore that was created. Fertilization is complete and the egg cells settle into a resting state throughout the winter and emerge in the spring (Fig. 3a lower dark oogonium is fertilized). Some fertilized oogonia can stay dormant for years.

Until 20 years ago we thought that these filaments were stationary. Work with time-lap photography tells a different story. The filaments are able to slowly move up and down in order to optimize light conditions. Under excessive light the filaments move down and move up if the light levels are too low. There is one problem, when the filaments get tangled up and start to form mats, movement is likely restricted. As these photosynthetic organisms product oxygen during the day and CO_2 during the night, the air bubbles get trapped in the entangled mats and the mats float to the surface (what we see). The trapped air continues to keep the mats at the surface for an extended period or until the filaments die back (go into a resting period) at the end of the summer.

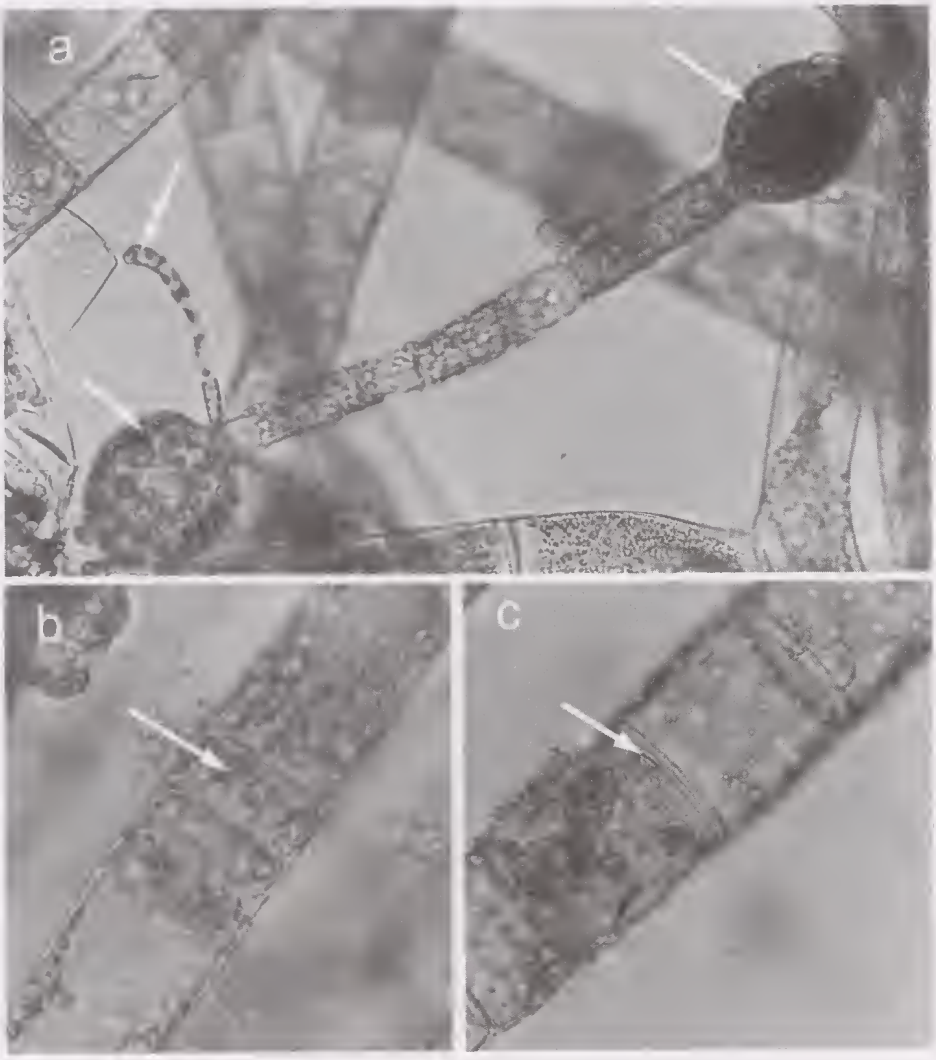

Figure 3. Sexual reproductions and cell structure. a) Oogonia (single arrow) and male antheridia (double arrow). Spermatozoids (flagellated cells) released from the tip cell of the antheridia swim to and fertilize the oogonia. b) These small compact cells (arrow) form androspores (flagellated cells) that swim close to oogonia and form the "male" antheridia filament (double arrow above). C) A series of broken caps at the end of a cell (arrow); a characteristic feature for Oedogonium.

Why & When

Don't blame the messenger. The extensive growth of these mats of algae in the Rideau River has both a recent and historic cause. The Rideau River is a constructed river/canal system. This man-made waterway during creation disturbed large areas of terrestrial land which caused extensive erosion and sediment/fertilizer inputs into the waterway. The Rideau waterway has never really stabilized from the made-made system and ongoing water level control. In addition new fertilizer loading from farming and urban development has sustained the high level of nutrients (fertilizer) in the lower part of the Rideau, from Burritts Rapids to Ottawa. Slow flow, good light conditions, higher ion (salt) levels due to soil erosion, and elevated nutrient levels are perfect conditions for the mat development of *Oedogonium*. The recent introduction of Zebra mussels from Burritts Rapids to Ottawa has cleared the water (reduced the number) of smaller microscopic algae, and other small matter, but has not affected the filament mat algae. Figure 1 shows the River at St. Patrick Street Bridge in Ottawa on August 30, 1999 and September 12, 2002. This illustrates that sometimes the mats will not appear, however these days most years will have mats from mid- to late summer. Historically, over the previous 62 years (1948–2010) the Rideau River flow data (an indirect measure of algae growth [faster flow less growth]) suggests that 36 years had conditions similar to 1999 and the other 26 years were similar to 2002. In recent times the growth is more similar to 2002. This is the prominent green alga of the Rideau.

Acknowledgements

Thank you to Linda Ley for providing the algal images. Insert in Figure 2a reproduced from *The Structure and Reproduction of the Algae*, Volume 1, Cambridge University Press, 1956.

beneath boughs of blushing apples
we sit sleepily in blankets of sun,
contrived by the seamster hum
of cicadas, till a thread's breadth
of an autumn current slips the edging . . .

Marie Clausén

The Other Plant Pests Regulated by Canada

K. McLachlan Hamilton

In the previous issue of *T&L* I attempted to address the questions concerning plant and plant pests regulated by Canada (McLachlan Hamilton 2014). The article provided a list and some information on the plants and the invertebrates that are currently regulated by Canada. It did not include the others—viruses, fungi, bacteria, phytoplasmas and unknowns—all the organisms I know virtually nothing about. However I needed to complete the project and fulfill my goal to become informed about the invasive species Canada regulates. So I began by learning something about these often overlooked organisms

Fungi

Fungi are defined as multi-cellular organisms that have a rigid cell wall (like a plant) but contains no chlorophyll, and the cell wall is made of chitin, not cellulose (Howard *et al.* 1994). Also fungi usually obtain the necessary nutrients from other organisms either after its host has died, or co-exist with its host sometimes helping the plant by providing/conserving water or producing toxins which protect the plant from herbivores (CFIA 2007).

Fungi disperse by spores. If the conditions are right, the spore will germinate, grow into a thread-like germ tube and then enter the plant. Spores can be soil-borne and be later transported to other sites through cultivation, erosion and water. They can also be airborne, using the wind for dispersal (Howard *et al.* 2007).

Viruses

Viruses are really small, from 20 to 1200 millimicrons in size (1cm=100000 millimicrons), and not visible even with a light microscope. Essentially they are a set of nucleic acid molecules encased in a protective protein/lipoprotein coat.

A virus is a obligate parasite and needs a host to survive as it can not capture or store energy on its own. The host provides the necessary proteins and nucleic acids which allows the virus to replicate. Hosts include almost all living organisms from algae to vertebrates and vascular plants. Most plant viruses are spread externally and must penetrate the plant's epidermis to be successful. This is often achieved by root

grafting, through mechanical means (i.e. cutting plants using infected pruners or ploughing fields with contaminated farm) or via vectors (insects, nematodes, humans). However, some viruses are seed borne (an infected plant produces infected seeds) (Howard 1994).

There are six major plant virus groups: double-stranded DNA (dsDNA), single-stranded DNA(ssDNA), double-stranded RNA(dsRNA), negative sense single stranded RNA (ssRNA-), positive sense single-stranded RNA(ssRNA+) and reverse-transcribing viruses. DNA viruses replicate in a host cell's nucleus whereas RNA viruses replicate in the host's cytoplasm. Reverse-transcribing viruses have either ssRNA or dsDNA and use the opposite genome to replicate (CFIA 2007).

Double-stranded DNA are the largest (up to 400,000 base pairs), but there are no plant viruses in this group. Most plant viruses belong to the ssRNA+ group; no plant viruses belong to the dsDNA group (CFIA 2007).

The viruses are the largest group of regulated plant pathogens, with 64 organisms (Table 2). I believe they are one of the more difficult groups to identify because there is little available information for some organisms. My primary resource was the online sites. Many were quite helpful, such as the CABI site (*http.//www.cabi.org*) and the *FAO/IBPGR Technical Guidelines* series, but they did not have all the information I was looking for. That is why there is a large section of unassigned organisms and some empty boxes. The information may be out there, I just did not find it. For someone interested in certain viruses, I would suggest seeking out a virologist.

Viroid

Viroids are smaller than a virus, contain only RNA which is 240-400 nucleotides long. A viroid must rely on its host for replication and does it by interfering with its metabolism.

Bacteria

Bacteria are microscopic unicellular organisms which have a cell wall but no chlorophyll. Reproduction is by binary fission and to complete one generation it takes 20 minutes to four hours depending on the species and environmental conditions (Howard *et al.* 1994). Due to the bacteria's small size and reduced morphological structure, an identification is based on laboratory methods. They are identified as gram negative or gram positive, which relates to the color it turns when stained and viewed under the microscope. Purple is positive and red is negative (Vidaver and Lambrecht 2014).

Bacteria are found everywhere. They are solitary or live in a monoculture or with

other species groups. They typically enter a plant through a natural opening such as stomata, roots, or an injury caused by an insect, fungus or man. One surprising example is through wind-driven rain carrying the bacteria.

Phytoplasmas

A phytoplasma is a new type of prokaryote (single-cellular organism) that is different from other pathogens. Phytoplasmas look like mycoplasmas (a microscopic bacteria-like organism) physically but behave like a viral infection. However, through genetic analysis it was determined that they form a distinct genus (Firrao *et al.* 2007). They do not have a cell wall, nucleus or cytoplasmic organelles. They are pleiomorphic or filamentous in shape, and have the smallest genome (CABI 2012).

Phytoplasmas are transmitted by plant sucking insects, primarily in the planthopper (Cicadellidae), leafhopper (Cixidae, Derbidae, Delphacidae) and jumping plant lice (Psyllidae) families. They are found in the phloem sieve tubes of plants, and are easily moved from an infected plant to a healthy one through the stylet of a feeding insect. They may also be transmitted through parasitic plants such as dodder (*Cuscuta* spp.). Both dodder and insects remain infected for the rest of their life (Bertaccini and Duduk 2009).

Phytoplasmas are responsible for hundreds of diseases in hundreds of plants worldwide; however, individual species may have a restricted distribution or host range. Plants containing phytoplasmas tend to develop leaf-like structures rather than flowers, produce sterile flowers, numerous axillary buds, abnormal internode elongations or appear stunted.

Unknowns

This classification is unclear. Some of the organisms were listed as "unassigned virus" so why are they not placed with the viruses? It may be due to how new this information is with respect to the regulated list. Whatever the reason, the classification was retained for this project.

Currently, Canada regulates 37 fungi (Table 1), nine bacteria (Table 3), 10 phytoplasmas (Table 4) and eight unknowns (Table 5).

Lessons Learned

- Do not move infected nursery stock. That is how many plant pests enter a new area.
- Use commercial seed. It should be pathogen free.
- Remove trees showing virus symptoms to protect other trees in the planting from becoming infected.
- If you are in an infected area always exercise sterile methods such as

dispose of diseased plant material by incineration, or transport it in a closed container and disinfect all tools before moving them to another site.

- Beware of what you have ordered. Little cherry disease is believed to be widespread because trees labeled as ornamental flowering cherry trees were distributed worldwide and later it was recognised that these trees were latent carriers of the virus.
- If an insect vector is known to spread a virus, controlling the insect may help to limit or reduce the rate of spread within an orchard.
- There are consequences of importing an organism (nematode Xiphinema americanum transmitting TomRSV).
- Only use indexed/certified budwood for propagation to minimize the transmission of pathogens.
- Herbaceous weeds growing around orchards can serve as a reservoir not only for insects to overwinter but also the viruses/phytoplasmas they may be carrying (i.e. Peach x-disease).
- The lists below explains why plants with soil from outside continental North America are prohibited and why people should declare items on their forms when entering Canada from other countries.

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Table 1. The fungi with scientific and common names, present distributions, plant hosts, mode of transmission and an online reference for further information where available. Primary hosts are in bold. Taxonomic order and family are included as subheadings.

Name	Present Distribution	Host	Dispersal method	Reference
Botryosphaeriales	**Botryosphaeriaceae**			
Guignardia bidwellii (Ellis) Viala & Ravaz Black rot of grape	Cosmopolitan. Present in Mexico, USA (16 states), Canada (BC, ON, QC, NS).	***Vitis***, *Parthenocissus*, *Ampelopsis*, *Aspleuium*, *Cissus*, *Citrus*	Transmitted by airborne ascospores. Overwinters in canes, leaves, and plant debris on the ground.	*http://www.cabi.org/cpc/datasheet/26152*
Chytridiales	**Synchytriaceae**			
Synchytrium endobioticum (Schilb.) Percival Wart disease of potato	Present with restricted distribution worldwide including Canada (NL). Eradicated in Mexico, USA..	***Solanum***	Spores transmitted by earthworms, in soil water or by contamin-ated plant products or farm equipment.	*http://www.cabi.org/cpc/datasheet/52315*
Diaporthales	**Diaporthaceae**			
Phomopsis viticola (Sacc.) Sacc. Dead-arm disease. Black knot	Widespread in temperate regions. Present in USA, Canada (ON),	**Vitus**. Olea, Parthenocissus	Transmitted by infected plants or through human activity. Can persist on dead grapevine wood..	*http://www.cabi.org/cpc/datasheet/40489*
	Melanconidaceae			
Coniella diplodiella (Speg.) Petr. & Syd. White rot	Widespread in Eurasia. Korea, Algeria, Nigeria, Uruguay. Found in India, Australia, Brazil, Mexico, USA (FL, MA, TX), Canada (ON).	***Hibiscus***, ***Vitis***	Dispersed through contaminated soil splashed on fruit by rain or hail. No known vector.	*http://www.cabi.org/cpc/datasheet/15183*

	Valsaceae			
Anisogramma anomala (Peck) E. Müller Eastern filbert blight	Native but with restricted distribution in USA (13 states), Canada (BC, MB, ON, QC, NS).	***Corylus***	Transmitted by wind and rain-splash, movement of contaminated plant material.	*http://www.eabi.org/cpc/datasheet/16431*
Diaporthe tanakae Ts. Kobayashi & Sakuma European pear dieback	Japan	*Malus*, *Pyrus*	Transmitted via wind and movement of contaminated material.	*http://www.bitkisagligi.net/elma/ozellik.asp?patlatin=Diaporthe%20tanakae*
Glomerellales	**Glomerellaceae**			
Colletotrichum panacieola Nakata & Takimoto Ginseng anthraenose	Korea, Eastern Russia, China, Japan	***Panax***, *Lupinus*	Transmitted by movement of contaminated material.	n/a
Helotiales	**Dermateaceae**			
Pseudopeziza trachciphila Müller-Thurgau Grapevine red fire disease	Widespread in Europe, Turkey, Tunisia. With restrieted distribution in Brazil.	***Vitis***	Transmitted via water-splash, airborne ascospores or by the transport of infected plants.	*http://www.cabi.org/cpe/datasheet/45251*
	Helotiaceae			
Gremmeniella abietina (Lagerb.) Morelet Scleroderris canker (NA raee)	Native for Europe, found in Japan, Georgia, USA (ME, MI, MN, NH, NY, VT), Canada (ON, QC, NB, NL).	**Pinus**, *Picea*	Transmitted via water-splash, airborne ascospores or by the transport of infected plants.	*http://www.inspeetion.ge.ea/plants/plant-proteetion/diseases/sele roderris-canker/factsheet/eng/1326229068400/1326229220399*

Name	Present Distribution	Host	Dispersal method	Referenee
Gremmeniella abietina var. *abietina* (Lagerb.) Morelet Scleroderris canker (European race)	Occurrence similar to *G. abietina* (NA race).	***Pinus*** , Abies, ***Picea***, ***Larix***.	Transmitted via water-splash, airborne ascospores or by the transport of infected plants.	*http://www.inspection.gc.ca/plants/plant-protection/diseases/scleroderris-canker/factsheet/eng/1326229068400/1326229220399*
	Hyaloseyphaeeae			
Lachnellula willkommii (Hartig) Dennis European larch canker	Established and widespread in Eurasia Introduced USA (ME), Canada (NB, NS, PE).	***Larix***, *Pseudolarix*	Transmitted through windblown ascospores from infected plants.	*http://www.cabi.org/cpc/datasheet/30017*
	Selerotiniaeeae			
Monilia polystroma G.C.M. Leeuwen Asiatic brown rot	Present in Japan, China, Switzerland, Czech Republic, with occurrences in Hungary, Serbia.	***Cydonia*** , ***Malus***, ***Pruuus***, ***Pyrus***	Dispersed via wind or rain-splash from infected plant material.	*http://www.cabi.org/cpc/datasheet/34755*
Monilinia fructigena Honey ex. Whetzel Brown rot	Widespread in Eurasia, Middle East, North Africa. Eradicated in USA(MD).	Various including: ***Pruuus***, ***Pyrus***, ***Malus***, *Capsicum*, *Vaccinium*, *Fragaria*, *Amelanchier*, *Rhododendron*	Transmitted by wind, rain-splash, or infected material. Vector: any insect that visits infected fruit (i.e. bees, beetles, flies, butterflies).	*http://www.cabi.org/cpc/datasheet/34747*
Monilinia laxa f.sp. *mali* (Woronin) Harrison Apple blossom blight	Present in Japan, China, Russia.	***Malus***	Transmitted by wind, rain-splash, or infected material. Vector: any insect that visits infected fruit (i.e. bees, beetles, flies, butterflies).	*http://www.cabi.org/cpc/datasheet/34752*

Sclerotinia pseudotuberosa Rehm Acorn rot, Chestnut rot	Belgium, Czech Republic, France, Germany, UK, Italy, Netherlands.	***Quercus*, *Castanea***	Transmitted by wind possibly soil from infected nuts.	*http://www.fungipedia.org/clasificacion-orden/ascomycota/leotiales/444-ciboria-batschiana.html*
Stromatinia cepivora (Berk.) Whetzel White rot of onion and garlic	Cosmopolitan in various degrees. Present in Mexico, USA (9 states), Canada (BC, MB, ON, QC).	***Allium***	Spread from contaminated bulbs via sclerotia in soil.	*http://www.cabi.org/cpc/datasheet/49145*
Hypocreales	**Nectriaceae**			
Fusarium oxysporum f.sp. *cannabis* Noviello & W.C. Snyder Fusarium wilt of hemp	Widespread in Italy. Occurs in Europe, Russia, USA (CA, IL, MD, MN).	***Cannabis sativa***	Lives in soil or crop debris. Transmitted via hyphae into seedling roots, or into wounded roots of older plants.	*http://www.cabi.org/cpc/datasheet/24631*
Microascales	**Ceratocystidaceae**			
Ceratocystis fagacearum (Bretz) Hunt Oak wilt	Present in USA (26 states), possibly Netherlands.	***Quercus*, *Castanea*, *Malus***	Transmitted by the movement of contaminated wood products (i.e. firewood), nursery stock. Vectors: *Pseudopityophthorus minutissimus* and *P. pruinosus* (Scolytidae) and sap beetles (Nitidulidae).	*http://www.inspection.gc.ca/plants/plant-protection/diseases/oak-wilt/fact-sheet/eng/1325629194844/1325632464641*
Myriangiales	**Elsinoaceae**			
Elsinoë ampelina Shear Grape anthracnose	Occurs worldwide where grapes are grown. Found in USA (FL, TX, SC, MS, MI), Canada (NS, QC).	***Rubus*, *Vitis***	Transmitted by rain-splash.	*http://www.cabi.org/cpc/datasheet/20773*

Name	Present Distribution	Host	Dispersal method	Reference
Ophiostomatales	**Ophiostomataceae**			
Ophiostoma novo-ulmi Brasier Dutch elm disease	Widespread throughout Eurasia, USA (15 states), Canada (ON, QC, NB). With restricted distribution in AB, NS, PE.	***Ulmus***	Transmitted via root grafts and insect vectors *Hylurogopinus rufipes Scolytus* and *Pteleobius*; possibly: *Xylosandrus*, *Xyloterinus*, *Monarthrum* (Scolytidae).	*http://www.cabi.org/isc/datasheet/37594*
Ophiostoma ulmi (Buisman) Nannf. Dutch elm disease	Widespread throughout Eurasia, USA (15 states), Canada (ON, QC, NB). With restricted distribution in AB, NS, PE).	***Ulmus***	Transmitted via root grafts and insect vectors *Hylurogopinus rufipes Scolytus* and *Pteleobius*; possibly: *Xylosandrus*, *Xyloterinus*, *Monarthrum* (Scolytidae)	*http://www.cabi.org/isc/datasheet/37594*
Peronosporales	**Peronosporaceae**			
Peronospora hyoscyami f.sp. *tabacina* (D.B. Adam) Skalicky Tobacco blue mold	Occurs in all regions where tobacco is grown. Widespread in USA (21 states). Eradicated in Canada (ON).	***Nicotiana***, *Capsicum*, *Lycopersicon*, *Solanum*	Transmitted by airborne spores but also through waterborne conidia or contact with contaminated plant material.	*http://www.cabi.org/cpc/datasheet/39733*
Phytophthora ramorum Werres et al. Sudden oak death, SOD	Present in Europe, USA, Canada (BC).	Various including: ***Arbutus***, *Vaccinum*, ***Heteromeles***, *Larix*, ***Pseudotsuga*** , ***Quercus***, *Viburnum*	Sporangia spread through air, water, soil, contact with contaminated nursery stock.	*http://www.cabi.org/cpc/datasheet/40991*

Phytophthora (>100 spp.)	Cosmopolitan.	Dicotyledons	Transmitted from infected plants through water in soil.	
Pseudoperonospora cannabina (G.H.Otth) Curzi Downy mildew of hemp	Widespread in Europe and temperate Asia. Present in USA(IL).	***Cannabis sativa***	Transmitted by wind and water dispersed sporangia.	*http://www.cabi.org/cpc/datasheet/45243*
Pleosporales	**Pleosporaceae**			
Alternaria gaisen Nagano Black spot of japanese pear	Widespread in Japan, present in Korea, China, Hungary, France.	***Pyrus pyrifolia***	Transmission through airborne conidia.	*http://www.cabi.org/cpc/datasheet/4511*
	Venturiaceae			
Venturia pyrina Aderhold Black spot of pear	Present worldwide. Occurs in USA (NJ, OR), Canada (BC, ON, QC, NB, NS, PE).	***Pyrus communis***, *Malus domestica*	Transmission through wind and waterborne ascospores.	*http://www.cabi.org/cpc/datasheet/56217*
	Unknown			
Phoma exigua var *foveata* (Foister) Boerema Potato gangrene	Occurs worldwide, in different degrees, where potatoes are grown. Absent in North America.	***Solanum tuberosum***, ***Chenopodium quinoa***	Transmitted through infected plants. All parts of the plants are susceptible.	*http://www.cabi.org/cpc/datasheet/40420*
Pucciniales	**Pucciniaceae**			
Gymnosporangium yamadae Miyabe ex G. Yamada Japanese apple rust	Native to China, Japan, Korea, Taiwan Russian Far East. Introduced into eastern USA with few occurrences in Canada (ON).	***Juniperus***, ***Malus***	Requires both apple and juniper to complete life cycle. Spores dispersed by wind (summer-fall) and rain (spring) dispersed.	*http://www.cabi.org/isc/datasheet/26238*

Name	Present Distribution	Host	Dispersal method	Reference
Puccinia coronata Corda Crown rust	Cosmopolitan where oat and fodder grasses are cultivated. Widespread in USA(21 states), Canada (SK, MB, ON, QC).	Various including: ***Agrostis***, ***Bromus***, *Festuca*, ***Lolium***, *Agropyron*, *Frangula*, *Hordeum*, *Phragmites*, *Poa*, *Rhamnus*	Transmission via airborne rust inoculum.	*http://www.cabi.org/cpc/datasheet/45769*
Puccinia graminis Pers. Stem rust of cereals	Cosmopolitan. Widespread in USA (45 states) and MB. With restricted distribution elsewhere in Canada except in NL.	***Avena***, ***Festuca***, ***Hordeum***, ***Poa***, ***Triticum***, *Berberis*, ***Dactylis***, *Elymus*, ***Lolium***, ***Phleum***, and ***Secale***	Transmitted via wind-borne spores and through movement contaminated plant material.	*http://www.cabi.org/cpc/datasheet/45797*
Puccinia horiana Henn Chrysanthemum white rust	Present in Eurasia, South Africa, Tunisia, Mexico, USA (MI, Mass, VI). Eradicated in Canada.	***Chrysanthemum***	Considered a greenhouse pest, transmitted by contaminated plant material.	*http://www.cabi.org/cpc/datasheet/45806*
Tilletia controversa J.G. Kühn Dwarf bunt of wheat	Widespread in Sweden, Czech Republic and Switzerland. Present in Eurasia, Northern Africa, Argentina, USA (12 states), Canada (BC, ON).	***Triticum***, ***Agropyron***, ***Hordeum***, ***Secale***, *Elymus*, Poaceae	Transmitted through contaminated soil. Spores persist for 3-10 years.	*http://www.cabi.org/cpc/datasheet/53924*
Tilletia indica Mitra Karnal blunt of wheat	Widespread in India. Present in Iraq, Afghanistan, Nepal, with restricted distribution in Middle East, South Africa, Brazil, Mexico, USA(AZ).	***Triticum***, *Triticale*.	Transmitted through contaminated seed or via wind-dispersed teliospores.	*http://www.cabi.org/cpc/datasheet/36168*

Urocystidiales	**Glomosporiaceae**			
Thecaphora solani (Thirum & M.J. O'Brien) Mordue Potato smut	Present in Bolivia, Panama, Colombia, Ecuador, Peru, Venezuela, Mexico. Intercepted only in USA.	***Solauum***, ***Datura***	Transmitted through contaminated tubers and plants. Persists in soil.	*http://www.cabi.org/cpc/datasheet/53508*
	Urocystidaceae			
Urocystis agropyri (Preuss)A.A. Fisch. Waldh. Flag smut of wheat	Widespread in wheat growing areas. Present in USA (37 states), Canada (BC, AB, MB, ON, QC).	Various including: ***Triticum***, *Agropyron*, *Agrostis*, *Alopecurus*, *Avena*, *Bromus*, *Poa*, *Calamagrostis*, *Elymus*, *Festuca*, *Hordeum*	Seed- and soil-borne transmission from spore balls.	*http://www.cabi.org/cpc/datasheet/55784*
Xylariales	**Xylariaceae**			
Rosellinia necatrix Prill. White root rot of trees	Present in Eurasia, Africa Argentina, Brazil, Dominican Republic, New Zealand, Mexico, USA (6 states). Not detected in Canada.	Various ineluding: ***Berberis***, *Juglans*, ***Camellia***, ***Dianthus***, ***Malus***, ***Narcissus***, *Prunus*, ***Pyrus***, ***Rosa***, ***Viola***, *Vitis*	If conditions are right will grow in the soil without the host (facultative parasite). Transmitted by mycelium and mycelial strands in the soil.	*http://www.cabi.org/cpc/datasheet/47860*

Table 2. The viruses with scientific and common names, present distributions, habitat preferences, modes of dispersal and an online image with further information. Primary hosts are in bold. Taxonomic order, family and genus are included as subheadings.

Name	Present Distribution	Host	Dispersal method	Reference
Nidovirales	**Bromoviridae**	***Alfamovirus***		
Potato yellowing virus PYV	Present in Bolivia, Chile, Ecuador, Peru.	***Solanum***	Transmitted by infected seed and tubers Vector: *Myzus persicae* (Aphididae).	*http://www.cabi.org/cpc/datasheet/42519*
Nidovirales	**Bromoviridae**	***Ilarvirus***		
American plum line pattern virus APLPV	Present with restricted distribution in New Zealand, Argentina, Italy, Albania, Lebanon. Occurs in USA, Canada (ON, NS).	***Prunus***	Transmissed by grafting, budding, or other mechanical processes, and by movement of infected material.	*http://www.eppo.int/QUARANTINE/virus/Plum_American_line_pattern_ilarvirus/APLPV0_ds.pdf* *http://www.cabi.org/cpc/datasheet/42128*
Prune dwarf virus Saponari Maria PDV	Considered cosmopolitan Present in USA (CA, GA, NY, SC, TN), Canada (ON).	***Prunus***, *Crataegus*	Transmitted by grafting, seed, and pollen. No known vector.	*http://www.cabi.org/cpc/datasheet/42402*
Prunus necrotic ringspot ilavirus PNRSV	Present worldwide, including USA (30 states), Canada (BC, ON).	Various including: *Malus*, ***Prunus***, ***Rosa***, ***Rubus***, *Lilium*, *Humulus*, *Corylus*.	May be spread by pollinating insects or through grafts of infected material.	*http://www.cabi.org/cpc/datasheet/42426*
Nidovirales	**Closteroviridae**	***Crinivirus***		
Potato yellow vein virus PYVV	With restricted distribution in Ecuador, Peru, Venezuela, Colombia.	***Solanum***, *Lycopersicon*, *Polygonum*	Vector: *Trialeurodes vaporariorum* (Psyllidae). Transmitted by graft inoculation.	*http://www.cabi.org/cpc/datasheet/43763*

Picornvirales	**Secoviridae Comovirinae**	***Comovirus***		
Andean potato mottle virus APMoV	Present in Bolivia, Peru, Argentina, Colombia, Costa Rica, Honduras, Nicaragua. With restricted distribution in Ecuador, Chile, Brazil.	**Solanum**, ***Capsicum***, *Datura*, *Nicandra*, *Nicotiana*	Commonly transmitted by flea beetles, (i.e. *Diabrotica*, *Epitrix*) or by contact with contaminated plants or tubers.	*http://www.eppo.int/QUARANTINE/virus/Potato_Andean_mottle_comovirus/APMOV0_ds.pdf* *http://www.cabi.org/cpc/datasheet/42520*
Picornvirales	**Secoviridae Comovirinae**	***Nepovirus***		
Arracacha B virus (oca strain) AVB	Present in Bolivia, Peru.	***Solanum***, ***Arracacia***, ***Oxalis***	Transmitted through true seed, and infected tubers. No known vector.	*http://www.cabi.org/cpc/datasheet/1775*
Artichoke Italian latent virus AILV	With restricted distribution in Bulgaria, Greece, Italy.	Various including: ***Cynara***, *Cichorium*, *Vitis*, *Sonchus*, *Papaver*	Transmitted by infected material mechanical inoculation.Vector: *Longidorus apulus* (Longidoridae).	*http://www.cabi.org/cpc/datasheet/3934*
Black currant reversion virus BRAV	Widespread in Eurasia. Occurs in New Zealand.	***Ribes***	Vector: *Cecidophyopsis* spp. (mite). Mites are easily wind blown to new hosts.	*http://www.cabi.org/cpc/datasheet/9249*
Cherry leaf roll nepovirus CLRV	Currently in Eurasia, Tunisia, Egypt, Chile, Peru, Australia, New Zealand, USA (12 states), Canada (BC).	Various including: ***Betula***, *Prunus*, ***Juglans***, ***Rubus***, ***Ulmus***. ***Prunus***, ***Fagus***, ***Fraxinus***	Transmitted by grafting. May be seed-transmissible Vector: *Xiphinema* spp. (Longidoridae), or *Myzus persicae* (Aphididae).	*http://pvo.bio-mirror.cn/descr198.htm* *http://www.cabi.org/cpc/datasheet/16077*

Name	Present Distribution	Host	Dispersal method	Reference
Cherry rasp leaf nepovirus CRLV	Occurs in western North America. Present, with few occurrences, in BC.	***Prunus***, ***Malus***, *Rubus*, *Plantago*, *Taraxacum*, *Balsamorhiza*	Transmitted by grafting, or by propagating infected material. Vector: *Xiphinema americana* (Dorylamidae).	*http://www.cabi.org/cpc/datasheet/16197*
Grapevine Bulgarian latent virus GBLV	Widespread in Bulgaria, Present in Portugal, former Yugoslavia, Hungary.	***Vitis vinifera***	Transmitted by the movement of infected material. No known vector.	*http://www.cabi.org/cpc/datasheet/26181*
Grapevine chrome (Hungarian) mosaic virus GCMV	Present in Croatia, Czech Republic, Slovakia, with restricted distribution in Australia, Hungary.	***Vitis***, *Apium*	Transmitted through propagating infected material. May be a soil-borne disease. No known vector.	*http://www.cabi.org/cpc/datasheet/25001*
Peach rosette mosaic nepovirus PRMV	Present in Egypt, with restricted distribution in Turkey, USA(MI, NY), Canada (ON).	***Prunus***, *Taraxacum*, *Vaccinium*, ***Vitis***	Transmitted mechanically by grafting and by seed in *Taraxacum*. Vector: *Xiphinema americanum* (Dorylamidae), *Longidorus diadecturus* (Longidoridae).	*http://www.cabi.org/cpc/datasheet/39224*
Potato virus U PVU	Occurs in Peru.	***Solanum***, *Chenopodium*	Transmitted by grafting, seed, not by contact between plants. Vector: *Longidorus* sp. (Dorylamidae).	*http://cropgenebank.sgrp.cgiar.org/images/file/learning_space/potato_tech_guid_safe_move_germplasm.pdf*

Raspberry ringspot nepovirus RRSV	Widespread throughout Europe. Present in Kazakhstan, with restricted distribution in Turkey.	Various including: *Forsythia*, ***Narcissus***, ***Prunus***, ***Ribes***, ***Rubus***, *Sambucus*, ***Vitis***, ***Weigela***	Transmitted through seed. Vector: *Longidorus* spp. (Dorylamidae).	*http://www.cabi.org/cpc/datasheet/48120*
Strawberry latent ringspot nepovirus SLRSV	Widespread in Europe. Present in India, Lebanon, Syria, Turkey, Egypt, Australia, New Zealand. Present in USA (CA, MD, NE, OH, OR), Canada (BC). Eradicated in NS, ON.	Various including: ***Prunus***, ***Fragaria***, *Capsella*, ***Ribes***, ***Rosa***, ***Trifolium***, *Urtica*, ***Vitis***	Transmitted through seed and nematode vector *Xiphinema diversicaudatum* (Xiphinematidae).	*http://www.cabi.org/cpc/datasheet/52200*
Tobacco ringspot nepovirus TRSV	Widespread in USA (35 states), Canada (BC, ON, QC, NB). Occurs in various degrees worldwide.	Various including: ***Cucumis***, ***Capsicum***, ***Nicotiana***, ***Glycine***, *Prunus*, *Rubus*, ***Vaccinium***, *Vitis*, ***Solanum***	Transmission by seed, grafting mechanical inoculation and the soil nematode vector *Xiphinema americanum* (Xiphinematidae).	*http://www.cabi.org/cpc/datasheet/54202*
Tobacco ringspot virus (potato calico strain) TBRSV-CA	Confirmed in Peru, probably occurs throughout Andean region.	Various including: ***Cucumis***, ***Capsicum***, ***Prunus***, *Vitis*, ***Solanum***	Transmission by seed, grafting mechanical inoculation. Vector: probably *Xiphinema americanum* (Xiphinematidae).	*http://www.cabi.org/cpc/datasheet/54202*
Tomato black ring virus (potato bouquet strain) TBRV	Occurs in Europe. Currently not in North America, eradicated from Canada (ON).	Several including: ***Allium***, ***Beta***, ***Vitis***, ***Brassica***, ***Fragaria***, ***Narcissus***, ***Phaseolus***, ***Ribes***, ***Rubus***, ***Solanum***,	Transmitted by seed and nematode vector *Longidorus* spp.	*http://www.cabi.org/cpc/datasheet/54060*

Name	Present Distribution	Host	Dispersal method	Reference
Tomato black ring virus (beet ringspot strain) TBRV	Occurs in Europe. Currently not in North America, eradicated from Canada (ON).	Several including: ***Allium, Beta, Brassica, Fragaria, Narcissus, Phaseolus, Ribes, Rubus, Solanum, Vitis***	Transmitted by seed and nematode vector: nematode Longidorus spp.	*http://www.cabi.org/cpc/datasheet/54060*
Tomato ringspot nepovirus ToRSV	Present in various degrees in Eurasia, Colombia, Brazil, Venezuela, Peru, USA (36 states), Canada (BC, ON). With restricted distribution in New Zealand, Chile.	Various including: ***Rubus***, ***Prunus***, ***Vitis***, ***Pelargonium***, *Hydrangea*, *Fraxinus*, *Taraxacum*	Transmitted through infected seed plants, and soil. Vector *Xiphinema* spp. (Xiphinematidae).	*http://www.cabi.org/cpc/datasheet/54076*
Tymovirales	**Betaflexiviridae**	***Capillovirus***		
Apple stem grooving capillovirus ASGV	Found worldwide where apples are grown. Present in USA (13 states), Canada (BC).	Various including: ***Malus***, *Lilium*, *Prunus*, *Pyrus*, *Sorbus*	Transmitted by grafting. No known vector	*http://www.cabi.org/cpc/datasheet/6560*
Tymovirales	**Betaflexiviridae**	***Foveavirus***		
Apple stem pitting virus foveavirus ASPV	Found worldwide where apples are grown. Present in USA (9 states), Canada (BC, ON, QC).	***Malus***, ***Prunus***, ***Pyrus***, *Pyronia*, *Crataegus*, *Sorbus*, *Cydonia*	Transmitted by grafting. No known vector	*http://www.cabi.org/cpc/datasheet/44667*
Cherry green ring mottle foveavirus CGRMV	Present in Eurasia Chile, South Africa, Australia, Japan, western USA, Canada (BC).	***Prunus***	Transmitted by root grafting. No known vector.	*http://www.cabi.org/cpc/datasheet/16027*

Cherry necrotic rusty mottle virus CNRMV	Present in Europe, China, Japan, Korea, Chile, Australia, New Zealand, USA(CA, MT, UT), Canada (BC).	***Prunus***	Transmitted by grafting and budding with infected material, and propagating infected trees. No known vector.	*http://www.cabi.org/cpc/datasheet/16107*
Pear stony pit agent, Apple stem pitting virus ASPV	Occurs in Australia, New Zealand, England, South Africa, USA (9 states), Canada (BC, ON, QC) or where pears are grown.	***Pyrus***, ***Malus***, *Sorbus*, *Cydonia*, *Crataegus*, *Pyronia*, *Prunus*	Transmitted through infected grafts. No known vector.	http://www.cabi.org/cpc/datasheet/44667
Tymovirales	**Betaflexiviridae**	***Trichovirus***		
Apple chlorotic leaf spot virus ACLSV	Found worldwide where apples are grown. Present in USA (10 states), Canada (BC, ON).	Various including: ***Malus***, ***Cydonia***, *Sorbus*, *Crataegus*, ***Prunus***, ***Pyrus***, *Amelanchier*	Transmitted by grafting or by the nematode vector Eudorylaimus sp. (Qudsianematidae).	*http://www.cabi.org/cpc/datasheet/6077*
Cherry mottle leaf trichovirus CMLV	Belgium, Italy, Poland, Romania, South Africa, Czech Republic, Slovakia, USA, Canada.	***Prunus***, *Chenopodium*	Transmitted by grafting and the mite vector *Eriophyes inaequalis* (Eriophyidae).	*http://pvo.bio-mirror.cn/descr199.htm*
Peach mosaic trichovirus PMV	Present in southern USA, with restricted distribution in Mexico.	***Prunus***	Vector: Peach bud mite *Eriophyes insidiosus* (Acari: Eriophyidae)	*http://www.cabi.org/cpc/datasheet/39164*
Potato virus T PVT	Occurs in Bolivia, Peru, perhaps other Andean regions.	***Solanum***, *Oxalis*, *Ullucus*	Transmitted by infected tubers. No known vector	*http://www.cabi.org/cpc/datasheet/43686*

Name	Present Distribution	Host	Dispersal method	Reference
Tymovirales	**Betaflexiviridae**	***Vitivirus***		
Grapevine corky bark virus GVA	Occurs in Eurasia, Middle East, South Africa Egypt, Morocco, Algeria, Tunisia, Brazil, Chile, Australia, USA (CA, MO).	***Vitis***	Transmitted by grafting of infecting material and the insect vectors *Neopulvinaria* (Coccidae), *Pseudo-coccus*, *Planococcus*, *Heliococcus* (rare) (Pseudococcidae)	*http://www.cabi.org/cpc/datash eet/26189*
Tymovirales	**Tymoviridae**	***Tymovirus***		
Andean potato latent virus APLV	Widespread Bolivia, Colombia, Ecuador, Peru. Present in Argentina, Chile.	***Solanum tuberosum*, *Ullucus tuberosus*,**	Transmitted by contact with contaminated plants, tubers and seed. Vector: (*Epitrix* sp.) when populations are high	*http://www.eppo.int/QUARANT INE/virus/Potato_Andean_laten t_tymovirus/APLV00_ds.pdf* *http://www.cabi.org/cpc/datash eet/42518*
Unassigned order	**Closteroviridae**	**Unassigned genus**		
Little cherry disease closterovirus 1 LChV-1	Known from Germany Belgium, Czech Republic, Poland, Switzerland USA (WA), Canada (BC).	***Prunus***	Transmitted by grafting and propagation of infected rootstocks and scions. No known vector	*http://www.cabi.org/cpc/datash eet/16072*
Little cherry disease closterovirus 2 LChV-2	Known from Japan, Belgium, Czech Republic, Poland, Switzerland and several US states, Canada (BC).	***Prunus***	Transmitted by grafting, through propagation of infected rootstocks and scions Vector: *Phenacoccus aceris* (Coccidae).	*http://www.cabi.org/cpc/datash eet/16072*

Little cherry disease closterovirus 3 LchV-3	Present in Canada (BC).	***Prunus***	Transmitted by grafting, through the propagation of infected rootstocks and scions. No known vector.	*http://www.cabi.org/cpc/datasheet/16072*
ssDNA virus	**Geminiveridae**	***Curtovirus***		
Beet curly top virus BCTV	Widespread in Uruguay, USA (25 states). Present in Canada (BC), Asia, Costa Rica, Argentina, Bolivia, Italy, Cyprus, Egypt, Iran, Japan, Korea.	Various including: ***Beta***, ***Capsicum***, ***Cucumis***, Linum, ***Phaesolus***, ***Solanum***, ***Vigna***	A phloem-transmitted virus that is moved by leafhopper vectors such as *Neoaliturus* sp.	*http://www.cabi.org/cpc/datasheet/10239*
		unassigned genus		
Potato deforming mosaic virus PDMV	Found in Brazil, Argentina.	***Solanum tuberosum***	Transmitted by grafting of infected material and the insect vector *Bemisia tabaci* (Psyllidae).	*http://www.cabi.org/cpc/datasheet/42823*
ssRNA virus	**Pospiviroidae**	***Apscaviroid***		
Apple scar skin viroid ASSVd	Present East Asia, Denmark, France, Greece, Italy, Poland, Argentina, UK, USA(MA, ME, MO, NH, WA),Canada (BC).	***Malus***, *Prunus*, *Pyrus*	Transmitted through budding and grafting of infected material. No known vector.	*http://www.cabi.org/cpc/datasheet/6086*
Pear blister canker viroid PBCVd	Present in Argentina, Albania, Greece.	***Cydonia***, ***Pyrus***, *Malus*	Transmitted probably through infected grafts. No known vector.	*http://www.cabi.org/cpc/datasheet/43926*

Name	Present Distribution	Host	Dispersal method	Reference
ssRNA virus	**Pospiviroidae**	***Pospiviroid***		
Potato spindle tuber viroid PSTVd	Widespread in central Russia, Belarus. Present sporadically in various countries worldwide. Occurs in USA (KS, ME, NC). Eradicated in Canada.	Various including: ***Brugmansia***, *Ipomoea*, ***Persea***, *Petunia*, *Physalis*, ***Solanum***	Transmitted by propagation of infected tubers, seed, cuttings and micro-plants. Low rate of transmission through aphid vectors *Macrosiphum euphorbiae*., and *M. persicae*.	*http://www.cabi.org/cpc/datasheet/43659*
Unassigned order (+) ssRNA virus	**Potyviridae**	***Potyvirus***		
Plum pox potyvirus sharka PPV	Occurs in Eurasia, Egypt, Argentina. Chile, with restricted distribution in Tunisia, USA (MI, NY, PA), Canada (ON).	Various including: ***Prunus***, *Juglans*, *Convolvulus*, *Taraxacum*, *Trifolium*	Transmitted by grafting infected material and aphid (Aphididae) vectors	*http://www.cabi.org/cpc/datasheet/42203*
Potato virus V PVV	Present in Peru, Bolivia, France, Netherlands, Germany, Ireland and UK.	***Solanum***, ***Leucopersicon***	Transmitted by grafting infected material and by the vectors *Myzus persicae*, *Brachycaudus helichrysi* and *Macrosiphum euphorbiae* (Aphididae)	*http://www.cabi.org/cpc/datasheet/45958* *http://ictvdb.bio-mirror.cn/ICTVdB/00.057.0.01.057.htm*
Potato virus Y[C] stipple-streak strain PVY[C]	Present in Australia, Ecuador, Europe, India North America, South Africa, New Zealand.	Various (41 species) including: ***Capsicum***, ***Nicotiana***, **Solanum**, *Latuca*.	Transmitted by infected potato tubers. Vectors include more than 50 aphid species.	*http://www.cabi.org/cpc/datasheet/43762*

Potato virus Y^N tobacco veinal necrosis strain PV Y^N	Present in Africa, Europe, New Zealand, Argentina, Chile, Colombia, Peru. Isolated outbreaks in North America.	Various (41 species) including: ***Capsicum***, ***Nicotiana***, **Solanum**, *Latuca*.	Transmitted by infected potato tubers. Vector: more than 50 aphid species.	*http://www.cabi.org/cpc/datasheet/43762*
Potato virus Y^{NTN} tobacco veinal necrosis Y^N subgroup PV Y^{NTN}	Present in Europe, Israel, Lebanon.	Various (41 species) including: ***Capsicum***, ***Nicotiana***, **Solanum**, *Latuca*.	Transmitted by infected potato tubers. Vector: more than 50 aphid species.	*http://www.cabi.org/cpc/datasheet/43762*
	Tombusviridae	***Tombuvirus***		
Tomato bushy stunt tombuvirus TBSV	Occurs in Europe, Peru, Tunisia, Bosnia-Herzegovina, Morocco, Tunisia, Peru Argentina, Japan, Pakistan, Singapore, USA (CA) and Canada (ON).	***Capsicum***, *Cornus*, *Malus*, *Pyrus*, *Poa*, ***Solanum*** ,*Tulipa*, *Urtica*, *Tolmiea*	Transmitted through contaminated debris, living roots or through contaminated water. Persists in soil. No known vector	*http://www.cabi.org/cpc/datasheet/54061*
	Virgaviridae	**Pomovirus**		
potato mop- top virus PMTV	Widespread in Finland, Sweden, UK. Occurs in Eurasia, Costa Rica, Bolivia, Colombia, Peru, Venezuela, USA (WA, ND, ID), Canada (NS, PE).	***Solanum tuberosum***	Transmitted by grafting. Vector: *Spongospora subterranea* (fungus Plasmodiophorales).	*http://www.cabi.org/cpc/datasheet/42827*

Name	Present Distribution	Host	Dispersal method	Reference
	Virgaviridae	***Tobravirus***		
Tobacco rattle virus TRV	Found worldwide, including USA (19 states), Canada (BC, AB SK).	Various (> 100 species) including: ***Capsicum***, ***Daucus***, *Lilium*, ***Iris*** ***Solanum***, *Plantago*, ***Tulipa***.	Highly infective, easily transmitted by infected plant. Nematodes *Trichodorus* and *Paratrichodorus* may spread through feeding, but spread is slow.	*http://www.cabi.org/cpc/datasheet/54208*
Unassigned order	**unassigned family**	**unassigned virus**		
Apple chat fruit disease APCF	Present in Europe, South Africa, New Zealand, USA but probably occurs worldwide where apples are grown. Has not been found in Canada.	***Malus***	Transmitted by grafting. No known, vector.	*http://www.cabi.org/cpc/datasheet/6076*
Apple ringspot agent APRS		***Malus domestica***	Transmitted by grafting and budding of infected material. No known vector.	*https://gd.eppo.int/taxon/APRS00/categorization*
Apricot ring pox agent	Present in USA (CA, CO, ID, OR, UT, WA), Canada (BC).	***Prunus***	Transmitted by grafting and budding of infected material. No known vector.	*http://www.cabi.org/cpc/datasheet/1961*
Cherry rough fruit agent CRF	Present in Iran and Bulgaria. Introduced to USA(UT) but currently eradicated.	***Prunus avium***	Transmitted by grafting, or movement of infected material. No known vector.	*http://www.cabi.org/cpc/datasheet/44344*

Cherry rusty mottle agent	Present in Europe, South Africa, New Zealand, USA(ID, MT, OR, WA), Canada (BC).	***Prunus***	Transmitted by grafting, budding or propagating infected material. No known vector.	*http://www.cabi.org/cpc/datasheet/16198*
Cherry short stem agent CRSS	Occurs in USA (MT, OR) and Canada (BC).	***Prunus***		*http://www.agf.gov.bc.ca/cropprot/tfipm/virus.htm* *http://babel.hathitrust.org/cgi/pt?id=mdp.39015001262719;view=1up;seq=128*
Grapevine asteroid mosaic virus	Present in Italy, Greece. South Africa, USA (CA).	***Vitis***	Transmitted by grafting. No known vector.	*Technical Guidelines for the Safe Movement of Grapevine Germplasm*
Grapevine chasselas latent agent	Present in France.	***Vitis***	Probably transmitted by grafting. No known vector.	
Grapevine enation agent	Present in Europe, Israel, Turkey, South Africa, New Zealand, Australia, USA(CA).	***Vitis***	Transmitted by grafting of infected material. No known vector.	*Technical Guidelines for the Safe Movement of Grapevine Germplasm*
Grapevine vein mosaic	Present in Europe and the Mediterranean.	***Vitis***	Transmitted by grafting of infected material. No known vector.	*Technical Guidelines for the Safe Movement of Grapevine Germplasm*
Kober stem grooving	Probably present worldwide in grape growing regions .	***Vitis***	Transmitted by grafting of infected material. *Pseudococcus* may be a vector.	*Technical Guidelines for the Safe Movement of Grapevine Germplasm*

Name	Present Distribution	Host	Dispersal method	Reference
LN33 stem grooving	Europe, Australia, New Zealand, South Africa, Venezuela, USA.	*Vitis*	Transmitted by grafting of infected material. *Pseudococcus* may be a vector.	
Peach wart agent	Present in USA (CA, ID, NM, OR, WA), with restricted distribution in Japan, France, Italy	***Prunus***	Transmitted through infected grafts. No known vector.	*http://www.prevalentviruses.org/subject.cfm?id=20954 http://www.plantwise.org/KnowledgeBank/Datasheet.aspx?dsid=39232*
Pear rough bark agent		***Pyrus***	Transmitted through infected grafts. No known vector.	
Spur cherry agent		***Prunus***	Transmitted through infected grafts. No known vector.	

Table 3. The bacteria with scientific and common names, present distributions, plant hosts, mode of transmission and an online reference for further information. Primary hosts are in bold. Taxonomic order and family are included as subheadings.

Name	Present Distribution	Host	Dispersal method	Reference
Actinomycetales	**Microbacteriaceae**			
Clavibacter michiganensis ssp. *sepedonicus* (Spiekermann & Kotthoff) Dye &Kemp Potato ring rot	Present in Eurasia, USA (9 states), Canada. Absent in South and Central America.	***Lycopersicon, Solanum***	Transmitted by infected tubers and by contact with contaminated farm equipment	*http://www.cabi.org/cpc/datasheet/15343*
Burkholderiales	**Comamonadaceae**			
Xylophilus ampelinus (Panagopoulos) Willems *et al* Canker of grapevine	Mediterranean and South African grape growing regions	***Vitis vinifera***	Transmitted mechanically by contaminated equipment and from contact with infected plant material or water.	*http://www.cabi.org/cpc/datasheet/56907*
Burkholderiales	**Ralstoniaceae**			
Ralstonia solanacearum Race 3 (Smith) Yabuuchi *et al* Bacterial wilt of geraniums	Widespread in Chile, Malawi. Present worldwide, but under/successful eradication in Europe and USA. Not found in Canada.	***Solanum***	Transmitted by contact with contaminated soil, or mechanically via contaminated water or equipment.	*http://www.inspection.gc.ca/plants/plant-protection/diseases/bacterial-wilt-of-geraniums/fact-sheet/eng/1328251127712/1328251256584*

Name	Present Distribution	Host	Dispersal method	Reference
Enterobacteriales	**Enterobacteriacea**			
Brenneria salicis (Day) Hauben *et al.* Watermark	Widespread in Netherlands, present in Japan, Italy Hungary, restricted in Belgium and UK	***Salix***	Transmitted through propagating infeeted material, or by wind to adjaeent trees. Known inseet veetor: *Cryptorhynchus lapathi* (Coleoptera: Cureulionidae),and *Xiphydria prolongata* (Hymenoptera: Xiphydriidae)	*http://www.cabi.org/cpc/datasheet/21936*
Pseudomonadales	**Pseudomonadaceae**			
Pseudomonas syringae pv. *aesculi* Horse ehestnut bleeding disease	Widespread in Netherlands, present in western Europe, Ireland, UK, India	***Aesculus***	Mode of transmission is unknown.	*http://www.cabi.org/cpc/datasheet/117974*
Pseudomonas syringae pv. *cannabina* (Sutic & Dowson) Young *et al.* Bacteriosis of hemp	Present in Bulgaria, Hungary, Italy, former USSR	***Phaseolus vulgaris***	n/a	*http://www.cabi.org/cpc/datasheet/45005*

Name	Present Distribution	Host	Dispersal method	Reference
Xanthomonadales	**Xanthomonadaceae**			
Xanthomonas campestris pv. *cannabis* Severin Leaf spot	Romania	***Phaseolus***, ***Nicotiana***, ***Morus***, ***Humulus***, ***Glycine***, ***Cannabis***, ***Cucumis***	n/a	*http://www.cabi.org/cpc/datasheet/56925*
Xanthomonas populi (ex Ridé) Ridé & Ridé Bacterial canker of poplar	Restricted distribution in Belgium, France, Germany, Netherlands	***Populus***, *Salix*	Transmitted by water splash, and by contact with contaminated equipment/human activity	*http://www.cabi.org/cpc/datasheet/56966*
Xylella fastidiosa Wells *et al* Pierce's disease	Present grape/peach growing regions of Taiwan, Turkey, Italy, South America, Mexico. Occurs in USA (30 states), Canada (ON)	Various including: ***Vitis***, ***Prunus***, ***Citrus***, ***Pyrus***, *Quercus*, ***Acer***, *Vaccinium*	Vector transmitted. Known vectors: leafhoppers (Cicadellidae), froghoppers (Cercopidae)	*http://www.cabi.org/cpc/datasheet/57195*

Table 4. The regulated phytoplasmas with scientific and common names, present distributions, plant hosts, mode of transmission an online reference for further information. Where there are numerous plant hosts, the listed primary hosts are in bold. Taxonomic order and family are included as subheadings.

Name	Present Distribution	Host	Dispersal method	Referenee
Acholeplasmatales	**Acholeplasmataceae**	***Phytoplasma***		
Apple rubbery wood phytoplasma ARW	Widespread in Norway and Italy, present or with restricted distribution worldwide including USA (MI, MS, NY, WA) and Canada (BC)	***Malus***, *Prunus*, *Pyrus*, *Cydonia*	Causal agent unknown. Transmitted by propagating infected plants or by grafting. Vector: unknown	*http://www.cabi.org/cpc/datasheet/6557*
Grapevine yellows phytoplasma Scemüller *et al.*	Widespread in grape growing areas including USA (NY, VA).	***Vitis***, *Solanum*, *Nicotiana*, *Fragaria*, *Datura*, *Capsicum*, *Convolvulus*, *Alnus*, *Carica*, *Apium*, *Phormium*	Transported through movement of infected material. Known vectors: leaf and planthoppers (Cicadellidae and Fulgoroidea).	*http://www.cabi.org/cpc/datasheet/14061* *http://www.inspection.gc.ca/plants/plant-protection/diseases/grapevine-yellows/identification-guide/eng/1326143947606/1326144092300*
Grapevine yellows phytoplasma Scemüller *et al* Bois noir stolbur (STOL) group	Described from northern France, but possibly widespread in grape growing areas. Detected in Canada (BC).	***Vitis***, *Solanum*, *Nicotiana*, *Fragaria*, *Datura*, *Convolvulus*, *Capsicum*, *Alnus*, *Carica*, *Apium*, *Phormium*, *Taraxacum*	Transported through movement or the grafting of infected material or insect/dodder vectors. Known vector: *Hyalesthes obsoletus* (Cixiidae), *Macrosteles* spp. (Cicadellidae) *Neoaliturus fenestratus* (Eusceliidae) and dodder (*Cuscuta* spp.)	*http://www.inspection.gc.ca/plants/plant-protection/diseases/grapevine-yellows/identification-guide/eng/1326143947606/1326144092300*

Grapevine yellows phytoplasma Seemüller *et al.* Flaveseence dorée phytoplasma elm yellows (EY) group	Present in Europe, possibly USA (NY).	***Vitis***	Transported through movement of infeeted material. Known veetor: *Scaphoideus titanus* (Cicadellidae) a North American speeies.	*http://www.cabi.org/cpc/datasheet/26184* *http://www.inspection.gc.ca/plants/plant-protection/diseases/grapevine-yellows/identification-guide/eng/1326143947606/1326144092300*
Grapevine yellows phytoplasma Seemüller *et al* Vergilbungskrankheit VK stolbur (STOL) group	Described from Germany but possibly widespread in grape growing areas including USA (NY, VA).	***Vitis***, *Solanum*, *Nicotiana*, *Fragaria*, *Datura*, *Phormium*, *Convolvulus*, *Capsicum*, *Alnus*, *Carica*, *Apium*, *Taraxacum*	Transported through movement of infected material. Known Vector: *Hyalesthes obsoletus* (Cixiidae) an insect not present in Canada and possibly dodder (*Cuscuta* spp.)	*http://www.cabi.org/cpc/datasheet/14061*
Peach yellows phytoplasma	Occurs in USA east of the Mississippi River where peaches are grown. Has restricted distribution in ON	***Prunus***	Transmission via transporting/ propagating infeeted material or veetors. Known veetor: *Macropsis trimaculata*. (Cicadellidae)	*http://www.cabi.org/cpc/datasheet/39168*
peach x-disease phytoplasma	Widespread in USA. Present in India and Canada (BC, ON, NB). Phytoplasmas of the x-disease group oeeur worldwide exeept Australia.	***Dodonaea***, *Medicago*, ***Prunus***	Transmission via transporting/ propagating infeeted material or veetors. Known veetors:: *Paraphlepsius irroratus*, *Scaphytopius acutus*, *Colladonus montanus*, *C. geminatus*, *Fieberiella florii*, *Graphocephala confluens* (Cicadellidae).	http://www.cabi.org/cpc/datasheet/39166

Name	Present Distribution	Host	Dispersal method	Reference
Phytoplasma mali Seemüller & Schneider APP apple proliferation	Widespread in Czech Republic, Hungary, Italy, Switzerland, Slovakia. Present, restricted or eradicated in many parts of Eurasia. Few occurrences in Canada (NS)	***Malus***, ***Prunus***, *Pyrus*, *Vitis*, *Lilium*, *Dahlia*, *Corylus*, *Cynodon*, *Catharanthus*, *Convolvulus*	Transmitted by grafting, and movement of infected material. Vector: Cacopsylla (Psyllidae)	*http://www.inspection.gc.ca/plants/plant-protection/diseases/apple-proliferation-phytoplasma/fact-sheet/eng/1368214278249/1368453914898*
Phytoplasma prunorum Seemüller & Schneider European stone fruit yellows phytoplasma	Present in Europe, Tunisia, Egypt, Turkey and Azerbaijan	***Prunus***, *Cynodon*, *Convolvulus*	Transmitted via grafting and movement of infected planting material. Known vector: leafhoppers (Cicadellidae) but only in infested areas.	*http://www.cabi.org/cpc/datasheet/34065*
Phytoplasma pyri Seemüller & Schneider PD pear decline	Widespread in Germany, Italy, Netherlands, Switzerland, but can be found, in varying degrees, worldwide. Occurs in USA (CT, CA, OR, WA) and Canada (ON)	***Pyrus***, *Prunus*, *Malus*, *Cydonia*, *Corylus*, *Catharanthus*	Transmitted via grafting, budding and chip budding. Known vectors: *Cacopsylla* spp.(Psyllids)	*http://www.cabi.org/cpc/datasheet/44021*

Table 5. The unknowns with present distributions, plant hosts, mode of transmission and an online reference for further information. Primary hosts are in bold.

Name	Present Distribution	Host	Dispersal method	Reference
Apple flat limb agent	Europe. May be present elsewhere where apples are grown.	***Malus domestica***	Transmitted by budding or grafting	*http://babel.hathitrust.org/cgi/pt?id=mdp.39015001262503;view=1up;seq=86*
Apple green crinkle disease unassigned virus	Occurs worldwide where apples are grown. Widespread in USA (WA). Found in USA(CA) and Canada (NS).	***Malus domestica***	Transmitted by grafting, possibly by movement of infected material. No known vector.	*http://www.cabi.org/cpc/datasheet/6105*
Apple rosette agent	Netherlands, Denmark, Italy, USSR.	***Malus***	Transmitted by grafting and budding of infected material No known unknown	*http://www.biosecurity.govt.nz/files/regs/imports/risk/draft-ira-apple-nursery-stock.pdf*
Apple rough bark agent	Present in Europe, UK Australia, USA.	***Malus***		
Apple star crack agent unassigned virus	Present in Europe, India, Iran, Turkey, Australia, Mexico and USA (WA).	***Malus domestica***	Transmitted by budding and grafting. No known vectors.	*http://www.cabi.org/cpc/datasheet/6553*
Cherry pink fruit agent unassigned virus	First and only found in USA (WA).	***Prunus cerasus***	Transmitted by grafting of infected material and movement of infected plants. No known vectors	*http://www.cabi.org/cpc/datasheet/55708*
Pear bud drop agent unassigned virus	France, Bulgaria, Italy, former USSR. Absent from Canada.	***Pyrus***	Transmitted by grafting of infected material	*Handbook of Plant Virus Diseases* pg 342-343
Plum rusty blotch	Found in USA (CA, WA), Argentina, Israel.	***Prunus***	Transmitted by grafting of infected material	*http://ucanr.edu/repository/files/ca1501p15-64816.pdf*

2014 Christmas Bird Counts

Ottawa-Gatineau Christmas Bird Count
This year's Ottawa-Gatineau CBC will be held on **Sunday December 14, 2013**. Details re: the post-count compilation and dinner will be provided to participants by the sector leaders, closer to the date of the event. For more information, please contact *birdcounts@ofnc.ca*.

Dunrobin-Breckenridge Christmas Bird Count
Another traditional local CBC, featuring more rural habitats than the Ottawa-Gatineau count, and not that far out of town! Please contact count coordinator Bruce Di Labio for details at 613-839-4395 or *bruce.dilabio@sympatico.ca* for this year's date and other information.

We encourage you to come out for these great traditional birding events in the Ottawa-Gatineau area! You don't need to be an "expert" birder to join in—even counting birds at your feeder from the comfort of your own home can be an important contribution. The more participants the better, to discover what's out there in our area during the fall and winter seasons!

OFNC Awards Night

Saturday 18 April 2015
7:00 p.m. - 10:00 p.m.
St. Basil's

Save the date for this annual event. Further information will be found on the OFNC website and in *T&L* closer to the date

OFNC Awards Call for Nominations

As the days become shorter, why not think about the brighter days ahead. And while dreaming for those warmer days, give some thought towards someone you think is deserving of an OFNC award.

There are seven different awards that recognize different categories of volunteer efforts: Member of the Year, Honorary Member, George McGee Service Award, Anne Hanes Natural History Award, two Conservation Awards (member and non-member) and the Mary Stuart Education Award.

Member of the Year is given to someone who has contributed substantially to the Club in the previous year while the Honorary Member award is to recognize contributions by a member (or non-member) to the OFNC or towards Canadian natural history.

The George McGee Service Award, named after a former member, is presented to someone (or a group) who has (have) contributed to the running of the Club over several years.

The Conservation Awards are presented to members or non-members who have contributed to the conservation of the Ottawa Valley, with particular emphasis in the Ottawa District. This could include anything from trying to protect natural lands, or protecting a species in decline to working on the protection/preservation of waterways.

The Anne Hanes Award is designed for someone who, through independent study, has contributed to the knowledge and appreciation of natural history. While the Mary Stuart Award focuses someone who has contributed to the dissemination of natural history knowledge.

For complete descriptions and a list of past recipients, visit the OFNC website (*http://www.ofnc.ca/awards.php#moy*). See if someone is missing from those lists and, if so, nominate someone. Please include a brief description as to why you have chosen that person, it will helpful.

All nominations may be directed to the Awards Committee (*ofnc@ofnc.ca*) by 31 December 2014. Decisions are made in January 2015, and awards are presented at the OFNC Awards Night.

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Coming Events

Arranged by the OFNC Events Committee
For further information, please check our website
www.ofnc.ca

PLEASE NOTE: The OFNC website (*ofnc.ca*) contains the most up-to-date information on events. Please check it regularly for changes or additions. The Club's Facebook site <*http://www.facebook.com/groups/379992938552/*> and Twitter account <*@OttawaFieldNat*> will also be used to announce last minute changes to events. **Note that we anticipate having several weather and year-dependent events that are not included in *Trail & Landscape* and will only be announced at the last minute via our website, Facebook and Twitter.** These include seasonal events such as Snowy Owl viewing, the spring Snow Goose spectacle, Eardley Eagles and Mudpuppy Night.

ALL OUTINGS: Field trips to natural areas in our region and beyond take place all year round. These events are for OFNC members and prospective members. Prospective members are welcome unless the notice indicates that participation is limited, or that bus travel is involved.

Please bring a lunch on full-day trips and dress according to the weather forecast and activity. Binoculars and/or spotting scopes are essential on all birding trips. Unless otherwise stated, transportation will be by car pool.

MONTHLY MEETINGS: Our monthly meetings will be held at the **Central Experimental Farm in the K.W. Neatby Building, Salon B, at 960 Carling Avenue.** There is ample free parking in the lot on the West side of Maple Drive by Carling Ave., immediately to the east of the main entrance to the Neatby Building.

EVENTS ORIENTED TO ALL AGES: Kids are welcome on all of our trips. We have highlighted particular hikes as "oriented to all ages" as these are most likely to be enjoyed by typical children. Depending on your child(ren)'s interests and stamina, please feel free to bring them along on any events. For events tailored to kids, check out the Macoun Field Club (*http://www.ofnc.ca/macoun/index.php*).

Saturday
11 October
9:15 a.m.
or
10:00 a.m.
(depending on meeting place!)
to
2:00 p.m.

RAMBLE AT REVELER CONSERVATION AREA

Leader: Owen Clarkin

Meet: 9:15 a.m. at Lincoln Fields Shopping Centre, northeast corner of parking lot, Richmond Road at Assaly Road, near Pizza Pizza.

or 10:00 a.m. at Reveler Conservation Area parking lot at the corner of Reveler Road and Concession 10–11 Road.

The Reveler Conservation Area near Crysler is like an oasis in the modern agricultural landscape. (*http://www.nation.on.ca/recreation/birding/reveler-conservation-area-crysler-ontario*) Recently donated for protection by the Reveler family, it is a property rich in flora and fauna. The site is diverse, with dry rocky uplands, meadows, rich forests, and moist lowlands, all in close proximity on limestone bedrock. Techniques for recognizing locally abundant woody plants will be shared. Robust populations of Butternut, Black Maple, Slippery Elm, and Rock Elm are among the highlights. All three native ash are present, with no noticeable Emerald Ash Borer impact (yet).

Hand lens, binoculars, field guides and notebooks could be of use, but are not required. Bring a lunch and drinking water and dress for the weather as this is a rain or shine event.

Sunday
12 October
9:00 a.m.
to
1:00 p.m.

WILD GOOSE CHASE IN WEST END

Leader: Richard Waters

Meet: Lincoln Fields Shopping Centre, northeast corner of parking lot, Richmond Road at Assaly Road, near Pizza Pizza.

Let's try to repeat the six-goose day we had back on Oct 12 2009! Of course we shall have a look for anything else of interest along the way. Dress and stock up for the weather. Bring a lunch or snack, binoculars and a scope, if you have one.

This is a rain or shine outing.

Tuesday
14 October
7:00 p.m.
Social

7:30 p.m.
Formal program

OFNC MONTHLY MEETING

AUSTRALIA: BIRDING THE LAND DOWN UNDER

Speaker: Mark Gawn

Location: Salon B, K.W. Neatby Building, Central Experimental Farm, 960 Carling Avenue.

With a plethora of endemic bird families, superb scenery, and (let's be honest) great wine, Australia is a premier birding destination. Mark Gawn recently sampled its avian riches, finding more than 400 species in a month long birding quest ranging from the snow bound forests of Tasmania to the baking heat of the Top End. Join Mark as he meets an Albatross whisperer, slogs through ankle deep ice cold water in search of the enigmatic Ground Parrot, and marvels at the diversity of Honeyeaters.

Saturday
18 October
9:00 a.m.
to
mid
afternoon

GENERAL INTEREST WALK—LIMERICK FOREST

Leader: Stew Hamill (613-269-3415 or *shamill@ripnet.com*).
Meet: 9:00 a.m. at Lincoln Fields Shopping Centre, northeast corner of the parking lot near Pizza Pizza, Richmond Road at Assaly Road.
or
10:00 a.m. at the Limerick Interpretive Centre (1175 Limerick Road). Contact Stew at for more information.

Limerick Forest is a 5782-hectare community forest in eastern Ontario, owned and managed by the United Counties of Leeds and Grenville. Conifer plantations account for approximately one third of the total area of Limerick Forest. This is a result of the reforestation of abandoned farmland by the Ministry of Natural Resources (MNR) via the Agreement Forest Program started in the early 1940s. The remainder of Limerick is comprised of wetlands and second growth mixed forest, in roughly equal proportions of one-third each.

The Friends of Limerick invite you to walk trails through plantation and swamp to two boardwalks overlooking marshes, looking for late summer wild flowers plus waterfowl and other birds. This 3.5 km hike will be followed by lunch and a visit to the Interpretive Centre. After lunch we can view the historic bird egg collection, containing 743 sets of eggs, some still in their original nests. Wear hiking gear, and bring a lunch.

Saturday
25 October
7:00 p.m.
to
9:00 p.m.

WILDLIFE IN SRI LANKA—A COLLECTION OF SHORT VIDEOS

Presenter: Jeewa Mendis
Location: Fletcher Wildlife Garden Interpretation Centre, off Prince of Wales Drive.

Jeewa is a gifted field naturalist with an amazing amount of patience and a wonderful eye for spotting unusual subjects and capturing them on camera. She will make a brief presentation on the wildlife of Sri Lanka and then show the videos and photos she took while visiting there last winter. Light refreshments will be served.

Saturday
1 November
8:30 a.m.
to
12:00 noon

FALL BIRDING
Leader: Jon Ruddy
Meet: Lincoln Fields Shopping Centre, northeast corner of the parking lot, Richmond at Assaly Road near Pizza Pizza. Carpool to wherever the finches are in the west part of Ottawa.
Let's head out for some fall fun! The focus will be on raptors and waterfowl. Early November, though often chilly, is a great time to get out and experience some of the fascinating and beautiful migrants that one can see throughout Ottawa. Depending on conditions and up-to-date reports, we will aim to observe waterfowl such as Loons, Scoters, Goldeneyes, Richardson's Cackling Goose, maybe even a Greater White-fronted Goose or two; and hawks and eagles such as Rough-legged Hawks, Northern Red-tailed Hawks, Bald Eagle, and maybe even a Golden Eagle. As always, we'll keep our field ears on for fly-over finches and our eyes on for migrant and local passerines. Dress for the weather, bring a snack, a warm drink, binoculars and a scope, if you have one.

Sunday
2 November
1:00 p.m.
to
4:00 p.m.

INSECT WORKSHOP
Presenter: Fenja Brodo (613-723-2054)
Location: Fletcher Wildlife Garden Interpretation Centre
This will be an introduction to basic entomology with the focus on distinguishing the main orders of insects (Orthoptera, Ephemeroptera, Diptera, Coleoptera, Lepidoptera, etc.). Microscopes, books, keys, and real specimens will help participants see and appreciate the beauty and the intricacy of insect structures that set the different groups apart. We need to limit this workshop to 12 people, so please register with Fenja if you plan to attend.

Tuesday	**OFNC MONTHLY MEETING**
11 November	**NCC CONSERVATION PLAN FOR THE OTTAWA**
7:00 p.m.	**VALLEY**
Social	**Speaker**: Gary Bell
	Location: Salon B, K.W. Neatby Building, Central Experimental Farm, 960 Carling Avenue.
7:30 p.m.	In the fall of 2013, the Nature Conservancy of Canada completed
Formal	a Natural Area Conservation Plan (NACP) for the Ottawa Valley,
program	in collaboration with a number of partners including the City of Ottawa, the National Capital Commission, and the Ontario Ministry of Natural Resources. This plan is a focused, regional analysis of conservation priorities and opportunities, and identifies a number of priority conservation projects over the next five years. Gary will outline the Conservancy's approach to conservation planning for the Ottawa Valley, and review some priority projects and actions in our area, some of which have been supported by the OFNC. These projects include land securement projects throughout the Ottawa Valley, from Petawawa to Hawkesbury. Of particular interest are the Gervais Caves in the Whitewater District, the Plantagenet Caves near Alfred, and recent additions to the Alfred Bog.

Tuesday	**OFNC MONTHLY MEETING**
9 December	**BABINA: BEING A BIRD IN NORTH AMERICA, NORTH**
7:00 p.m.	**OF MEXICO**
Social	**Speaker**: Robert Alvo
	Location: Salon B, K.W. Neatby Building, Central Experimental Farm, 960 Carling Avenue.
7:30 p.m.	This talk will introduce a forthcoming book that will set the stage
Formal	for similar books on other vertebrate groups, invertebrates, plants
program	and natural communities. The book treats each of the 700 species that breed in North America (as defined by the American Birding Association) in three volumes. One page is allotted per species, focusing on interesting aspects of each species in a "best of each species" approach. Each species page has a cartoon (18 artists have contributed), a global range map, NatureServe conservation status ranks (global and national for the U.S. and Canada), at least one photo and the written account. Spanish bird names for use in Mexico will be presented using the list recently adopted by the Mexican government. Taxonomy, nomenclature, and species ordering follow the American Ornithologists' Union. An appendix treats the other 300 species that occur but that do not breed regularly in North America. See *www.babina.ca*.

Tuesday	**OFNC MONTHLY MEETING**
13 January	**136th ANNUAL BUSINESS MEETING**
7:00	**Location**: Fletcher Wildlife Garden Interpretive Centre, off Prince
Social	of Wales Drive.
7:30 p.m.	**Description**: The Council for 2015 will be elected at this meeting.
Formal	There will be a brief review of the activities in 2014 and a
program	statement of the Club's finances will be given. This is an opportunity to meet most of the Club's executives and the chairs of the various committees and to find out what makes your Club tick.

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DEADLINE: *Material intended for the January - March issue must be in the editor's hands by 1 November 2014. Mail your manuscripts to:*

Karen McLachlan Hamilton
2980 Moodie Drive, Nepean, ON, K2J 4S7
H: (613) 838-4943; email: *hamilton@storm.ca*

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